RECEIVED
CENTRAL FAX CENTER

JAN 09 2006

Practitioner's Docket No. MSC 23436-1

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Patrick W. Fink et al.
Application No.: 10/679,688
Filed: October 2, 2003
For: Deployable Antenna

Examiner: Michael C. Wimer
Art Unit: 2828
Confirmation#:5309

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF FACSIMILE

I hereby certify that the correspondence detailed below is transmitted via facsimile to 571-273-8300, in care of the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date noted below.

Reply to Office Action and PTO/SB/17 Fee Transmittal - 25 pages (to include this certificate of facsimile)

1/9/06
Date

Tanya Jefferson
Tanya B. Jefferson

RECEIVED
CENTRAL FAX CENTER
JAN 09 2006

PTO/SB/17 (12-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 500.00

Complete if Known	
Application Number	10/679,688
Filing Date	October 2, 2003
First Named Inventor	Patrick W. Fink
Examiner Name	Michael C. Wimer
Art Unit	2828
Attorney Docket No.	MSC-23436-1

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): ____________

☑ Deposit Account Deposit Account Number: 14-0116 Deposit Account Name: NASA

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☑ Charge fee(s) indicated below ☑ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
Application Type	**Fee ($)**	**Small Entity Fee ($)**	**Fee ($)**	**Small Entity Fee ($)**	**Fee ($)**	**Small Entity Fee ($)**	**Fees Paid ($)**
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	**Fee ($)**	**Small Entity Fee ($)**
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims		**Extra Claims**		**Fee ($)**		**Fee Paid ($)**
64	- 20 or HP =	2	x	50	=	100

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		**Extra Claims**		**Fee ($)**		**Fee Paid ($)**
10	- 3 or HP =	2	x	200	=	400

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	**Fee Paid ($)**

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		**Extra Sheets**		**Number of each additional 50 or fraction thereof**		**Fee ($)**		**Fee Paid ($)**
	- 100 =		/ 50 =	(round up to a whole number)	x		=	

4. OTHER FEE(S) **Fees Paid ($)**

Non-English Specification, $130 fee (no small entity discount) ____________

Other (e.g., late filing surcharge): ____________ ____________

SUBMITTED BY

Signature	Theodore U. Ro	Registration No. (Attorney/Agent) 52,168	Telephone 281-244-7148
Name (Print/Type)	Theodore U. Ro		Date 1/9/06

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

RESPONSE

Sir:

In response to the Office Action dated October 12, 2005, please amend the above-identified application as follows:

Listing of Claims begins on page 3 of this Response.

Remarks begin on page 20 of this Response.

USTPO Form PTO/SB/17 Fee Transmittal begin on page 25

Amendments to the Claims:

This listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (Currently Amended): An antenna comprising:

a collapsible membrane having at least one radiating slot for transmitting electromagnetic waves, receiving electromagnetic waves, or both; and

a ring support formed of a deformable, spring-like material attached to the perimeter of the collapsible membrane.

2 (Original): The antenna according to claim 1, wherein the collapsible membrane is formed of at least one layer of conductive material attached to at least one layer of nonconductive material and wherein the at least one radiating slot is excised from the at least one layer of conductive material.

3 (Original): The antenna according to claim 1, further comprising:

at least one fastener of nonconductive material and of predetermined length wherein one end of the at least one fastener is attached to the collapsible membrane; and

a reflector attached to the second end of the at least one fastener wherein the reflector is generally parallel to the at least one radiating slot and spaced at a predetermined distance from the at least one radiating slot.

4 (Currently Amended): The antenna according to claim 1, wherein the collapsible membrane is formed of a flexible, conductive material and further comprising:

~~a ring support attached to the perimeter of the collapsible membrane wherein the ring support is formed of a deformable, spring-like material;~~

a ground plane boundary component attached to the ring support at the perimeter of the ground plane boundary component and wherein the ground plane boundary component is collapsible and formed of a flexible, conductive material; and

a collapsible dielectric spacer contained between the collapsible membrane and the ground plane boundary component wherein the collapsible dielectric spacer is formed of a material with a relative dielectric constant greater than or equal to 1.

5 (Original): The antenna according to claim 4, further comprising an antenna interface adapter electrically connected to the at least one radiating slot, wherein the antenna interface adapter comprises at least one balun.

6 (Original): The antenna according to claim 4, further comprising:

a probe electrically connected to the ground plane component on the probe's first end, wherein the probe loops back and passes through the ground plane component but is insulated from the ground plane component by a non-conductive grommet to prevent electrical connectivity at a second point; and

an antenna interface adapter electrically connected to the ground plane component and to the probe on the probe's second end.

7 (Currently Amended): An antenna comprising:

at least one collapsible membrane;

a ring support formed of a deformable, spring-like material attached to the perimeter of the at least one collapsible membrane; and at least one radiating element attached to one of the at least one collapsible membrane for transmitting electromagnetic waves, receiving electromagnetic waves, or both.

8 (Original): The antenna according to claim 7, wherein the at least one collapsible membrane is formed of a flexible, nonconductive material and the at least one radiating element is formed of a conductive fabric.

9 (Original): The antenna according to claim 7, wherein the at least one radiating element is comprised of a ground plane wherein the ground plane is attached to one of the at least one collapsible membrane, a substrate wherein the substrate is attached to the ground plane, a feed network wherein the feed network is attached to the substrate, and a radiating component wherein the radiating component is attached to the substrate and electrically connected to the feed network.

10 (Original): The antenna according to claim 7, wherein one of the at least one collapsible membrane is a ground plane and the at least one radiating element is comprised of a substrate wherein the substrate is attached to the collapsible membrane, a feed network wherein the feed network is attached to the substrate, and a radiating component wherein the radiating component is attached to the substrate and electrically connected to the feed network.

11 (Original): The antenna according to claim 7, wherein the at least one radiating element is a plurality of radiating elements and further comprising:

at least one transmission line electrically connected to the plurality of radiating elements; and

at least one distribution network electrically connected to the at least one transmission line.

12 (Original): The antenna according to claim 11, further comprising at least one power source electrically connected to the at least one distribution network.

13 (Original): The antenna according to claim 11, further comprising:

at least one power distribution subsystem electrically connected to the at least one distribution network; and

at least one power source electrically connected to the at least one power distribution subsystem.

14 (Original): The antenna according to claim 7, further comprising at least one transmission line electrically connected to the at least one radiating element and an antenna interface adapter electrically connected to the at least one transmission line.

15 (Original): The antenna according to claim 14, further comprising:

at least one fastener of nonconductive material and of predetermined length wherein one end of the at least one fastener is attached to the at least one collapsible membrane; and

a reflector attached to the second end of the at least one fastener wherein the reflector is generally parallel to the at least one radiating element and spaced at a predetermined distance from the at least one radiating element.

16 (Original): The antenna according to claim 7, further comprising a support means for supporting the at least one collapsible membrane at a predetermined angle relative to a surface.

17 (Original): The antenna according to claim 7, further comprising a container for temporarily storing the at least one collapsible membrane.

18 (Currently Amended): An antenna comprising:

a collapsible membrane;

a ring support formed of a deformable, spring-like material attached to the perimeter of the collapsible membrane; and

at least one radiating means for transmitting electromagnetic waves, receiving electromagnetic waves, or both attached to the collapsible membrane by an attachment means for attaching the radiating means to the collapsible membrane.

19 (Original): The antenna according to claim 18, further comprising at least one transmission line attached to the collapsible membrane by a transmission line attachment means for attaching the transmission line to the collapsible membrane.

20 (Original): The antenna according to claim 18, further comprising at least one transmission network attached to the collapsible membrane by a transmission network attachment means for attaching the transmission network to the collapsible membrane.

21 (Original): An antenna comprising:

a collapsible back layer;

a collapsible front layer attached to the perimeter of the collapsible back layer; and

at least one radiating means for transmitting electromagnetic waves, receiving electromagnetic waves, or both wherein the radiating means is attached to either the collapsible front layer or the collapsible back layer.

22 (Currently Amended): An antenna comprising:

a collapsible membrane of deformable, nonconductive material wherein the collapsible membrane is collapsible into a plurality of sections;

a ring support formed of a deformable, spring-like material attached to the perimeter of the collapsible membrane; and

at least one array antenna attached to the collapsible membrane for transmitting electromagnetic waves, receiving electromagnetic waves, or both.

23 (Original): The antenna according to claim 22, wherein the at least one array antenna is comprised of a plurality of radiating elements, a plurality of subarrays, or both.

24 (Original): The antenna according to claim 22, wherein the collapsible membrane is formed of at least one layer of conductive material attached to at least one layer of nonconductive material and the at least one array antenna is formed of a plurality of radiating slots excised out of the at least one layer of conductive material.

25 (Original): The antenna according to claim 22, wherein the at least one array antenna is a traveling wave antenna.

26 (Original): The antenna according to claim 22, wherein the at least one array antenna is a plurality of array antennas and wherein the plurality of array antennas is attached to one of the plurality of sections.

27 (Original): The antenna according to claim 22, wherein the at least one array antenna is comprised of a plurality of radiating elements and wherein the plurality of radiating elements is attached to one of the plurality of sections.

28 (Original): The antenna according to claim 22, wherein the at least one array antenna is comprised of a plurality of radiating elements, wherein the number of sections is equivalent to

the number of radiating elements, and wherein the plurality of sections has one radiating element attached thereto.

29 (Original): The antenna according to claim 22, further comprising:

a plurality of fasteners formed of nonconductive material and of predetermined length wherein one end of the plurality of fasteners is attached to the collapsible membrane; and

a reflector attached to the second end of the plurality of fasteners wherein the reflector is generally parallel to the at least one array antenna and spaced at a predetermined distance from the at least one array antenna.

30 (Original): The antenna according to claim 22, further comprising:

at least one transmission line electrically connected on one end to the at least one array antenna; and

at least one distribution network electrically connected to the second end of the at least one transmission line.

31 (Original): The antenna according to claim 30, wherein the at least one transmission line is selected from a group consisting of a coaxial line, a slotline, a stripline, a microstrip, and a twin coupled line.

32 (Original): The antenna according to claim 30, wherein the distribution network is selected from a group consisting of a power divider, power combiner, a filter, a phase shifter, and a low noise amplifier.

33 (Original): The antenna according to claim 30, further comprising a support means for supporting the collapsible membrane at a predetermined angle relative to a surface wherein the support means is attached to the collapsible membrane.

34 (Cancelled)

35 (Currently Amended): The antenna according to claim ~~34~~ 22, wherein the ring support is formed of a nonconductive, deformable, spring-like material.

36 (Original): The antenna according to claim 35, wherein the nonconductive, deformable, spring-like material is selected from a group consisting of fiberglass, carbon, and carbon-glass composites.

37 (Original): The antenna according to claim 30, further comprising:

a plurality of fasteners of nonconductive material and of predetermined length wherein one end of the plurality of fasteners is attached to the collapsible membrane; and

a reflector attached to the second end of the plurality of fasteners wherein the reflector is generally parallel to the at least one array antenna and spaced at a predetermined distance from the at least one array antenna.

38 (Currently Amended): An antenna comprising:

a first collapsible membrane of deformable, nonconductive material wherein the first collapsible membrane is collapsible into a plurality of sections;

a first ring support formed of a deformable, spring-like material secured to the perimeter of the first collapsible membrane; and

at least one radiating means for transmitting electromagnetic waves, receiving electromagnetic waves, or both wherein the at least one radiating means is attached to the first collapsible membrane.

39 (Original): The antenna according to claim 38, wherein the at least one radiating means function to guide a traveling wave as in a traveling wave antenna.

40 (Original): The antenna according to claim 39, wherein the at least one radiating means is arranged in a generally parallel and longitudinal manner relative to the principal direction of radiation.

41 (Original): The antenna according to claim 40, wherein the at least one radiating means is two elongated boundary components arranged in the shape of a "V".

42 (Currently Amended): The claim according to 41, further comprising:

~~a first ring support formed of a first deformable, spring-like material secured to the perimeter of the first collapsible membrane;~~

a plurality of second collapsible membranes secured to the first collapsible membrane wherein the plurality of second collapsible membranes are formed of a deformable, conductive material;

a plurality of second ring supports secured to the perimeter of the plurality of second collapsible membranes and wherein the plurality of second ring supports are formed of a second deformable, spring-like material; and

a third ring support surrounding the collapsible membrane and the plurality of second collapsible membranes and wherein the third ring support is formed of a nonconductive, deformable, spring-like material.

43 (Original): The claim according to 41, wherein the open ends of the two elongated boundary components in the shape of a "V" are connected with an elongated resistance, wherein the resistance is formed of a fabric with a predetermined conductivity.

44 (Currently Amended): The antenna according to claim 40, further comprising:

a backedge formed of a conductive material attached to the first collapsible membrane~~; and~~

~~a ring support attached to the perimeter of the collapsible membrane wherein the ring support is formed of a non-conductive, spring like material~~.

45 (Original): The antenna according to claim 39, further comprising at least one parasitic element, wherein the at least one radiating means is at least one driven element, and wherein the at least one driven element and at least one parasitic element are arranged in an orthogonal manner relative to the principal direction of radiation as is typical in a Yagi-Uda and log-periodic antenna.

46 (Currently Amended): The antenna according to claim 45, further comprising:

a backedge formed of a conductive material attached to the first collapsible membrane;

at least one balun electrically connected to the at least one driven element and attached to the first collapsible membrane;

at least one transmission line electrically connected to the at least one balun and attached to the first collapsible membrane; and

at least one antenna interface adapter electrically connected to the at least one transmission line and attached to the first collapsible membrane~~; and~~

~~a ring support attached to the perimeter of the collapsible membrane wherein the ring support is formed of a non-conductive, spring like material~~.

47 (Original): The antenna according to claim 38, wherein the deformable, nonconductive material is selected from a group consisting of fabric, plastic, and paper.

48 (Currently Amended): The antenna according to claim 38, further comprising:

at least one distribution network attached to the first collapsible membrane; and

at least one transmission line wherein the at least one transmission line is attached to one radiating means on one end and to one distribution network on the second end.

49 (Currently Amended): The antenna according to claim 38, further comprising a support means for supporting the first collapsible membrane at a predetermined angle relative to a surface wherein the support means is attached to the collapsible membrane.

50 (Currently Amended): The antenna according to claim 38, further comprising:

a plurality of fasteners of nonconductive material and of predetermined length wherein one end of the plurality of fasteners is attached on one end to the first collapsible membrane; and

a reflector attached to the second end of the plurality of fasteners wherein the reflector is generally parallel to the at least one radiating means and spaced at a predetermined distance from the at least one radiating means.

51 (Original): An antenna comprising:

a ring support formed of a conductive, deformable, spring-like material;

a collapsible membrane secured at its perimeter to the ring support wherein the collapsible membrane is formed of a nonconductive material; and

an antenna interface adapter electrically connected to the ring support.

52 (Original): An antenna comprising:

a first ring support formed of a deformable, spring-like material;

a radiating element ring secured to the first ring support at the radiating element ring's outside perimeter wherein the at least radiating element ring is collapsible, forming a vacant area of air that shares a common center with the first ring support, and forming a gap such that the radiating element ring does not complete a full circle; and

an antenna interface adapter electrically connected to the radiating element ring.

53 (Original): The antenna according to claim 52, further comprising a collapsible membrane secured to the antenna wherein the collapsible membrane is formed of a nonconductive material and fills in the vacant area of air.

54 (Original): The antenna according to claim 52, further comprising a second ring support secured to the inside perimeter of the radiating element ring wherein the second ring support is formed of a deformable, spring-like material.

55 (Original): An antenna comprising:

at least one boundary component comprised of at least one collapsible membrane formed of a flexible, conductive material;

a first ring support attached to the at least one boundary component wherein the first ring support is formed of a deformable, spring-like material;

a second ring support attached to the at least one boundary component and coupled to the first ring support in such as way as to allow folding the first and second ring supports with respect to each other, thus forming a wedge, and wherein the second ring support is formed of a deformable, spring-like material;

a feed probe electrically connected on the feed probe's first end to the at least one boundary component inside either the perimeter of the first or second ring supports and passing through the perimeter of the second ring support; and

an antenna interface adapter electrically connected to the feed probe's second end.

56 (Currently Amended): The antenna according to claim 55, further comprising a prop attached to the antenna in such a manner as to sustain a wedge relative to the first and second ring supports wherein the prop is formed of a semi-rigid or rigid, nonconductive material.

57 (Original): The antenna according to claim 55, further comprising at least one side boundary component electrically connected to the at least one boundary component in such as manner as to alter the input impedance of the antenna or increase the directivity of the antenna in its deployed state.

58 (Original): The antenna according to claim 55, wherein the feed probe is a loop-type feed, passes through the perimeter of the second ring support, loops back and is electrically connected to the at least one boundary component inside the perimeter of the second ring support on the feed probe's first end and wherein the feed probe is not directly connected to the at least one boundary component inside the perimeter of the first ring support.

59 (Original): The antenna according to claim 55, wherein the at least one boundary component is comprised of:

a first boundary component attached at its perimeter to the first ring support and wherein the first boundary component is comprised of a first collapsible membrane formed of a flexible, conductive material;

a second boundary component attached at its perimeter to the second ring support and coupled to the first boundary component wherein the second boundary component is comprised of a second collapsible membrane formed of a flexible, conductive material;

and wherein the feed probe is electrically connected on the feed probe's first end to either the first boundary component or second boundary component and passing through the second boundary component.

60 (Original): The antenna according to claim 59, wherein the feed probe is electrically connected to the first boundary component on the feed probe's first end and wherein the feed probe is not directly connected to the second boundary component.

61 (Original): The antenna according to claim 59, wherein the feed probe is a loop-type feed, passes through the second boundary component, loops back and is electrically connected to the second boundary component on the feed probe's first end and wherein the feed probe is not directly connected to the first boundary component.

62 (Original): An antenna comprising:

a first collapsible membrane formed of a flexible, nonconductive material;

a ring support attached to the perimeter of the first collapsible membrane wherein the ring support is formed of a deformable, spring-like material;

at least one top boundary component formed of flexible conductive material, flexible non-conductive material, or both supported by the first collapsible membrane;

a ground plane boundary component attached to the ring support at the perimeter of the ground plane boundary component wherein the ground plane boundary component is formed of a flexible, conductive material;

a collapsible dielectric spacer contained between the first collapsible membrane and the ground plane boundary component wherein the collapsible dielectric spacer is formed of a material with a relative dielectric constant greater than or equal to 1,

at least one probe feed electrically connected to the at least one top boundary component, wherein the at least one probe feed extends through the collapsible membrane, collapsible dielectric spacer, and ground plane boundary component, wherein the at least one probe feed is not electrically connected to the ground plane boundary component, and wherein the at least one probe feed is formed of a conductive material; and

an antenna interface adapter electrically connected to the at least one probe feed and the ground plane boundary component.

63 (Original): The antenna according to claim 62, wherein the collapsible dielectric spacer is comprised of a first and second spacer layer and further comprised of a capacitive feed contained between the first and second spacer layer and electrically connected to the at least one probe feed and wherein the capacitive feed is formed of a conductive material.

64 (Original): The antenna according to claim 62, wherein the at least one top boundary component is an array and further comprised of a distribution network attached to the collapsible membrane and electrically connected to the at least one probe feed and array.

65 (New): An antenna comprising:

a collapsible membrane of deformable, nonconductive material wherein the collapsible membrane is collapsible into a plurality of sections;

at least one array antenna attached to the collapsible membrane for transmitting electromagnetic waves, receiving electromagnetic waves, or both;

a plurality of fasteners formed of nonconductive material and of predetermined length wherein one end of the plurality of fasteners is attached to the collapsible membrane; and

a reflector attached to the second end of the plurality of fasteners wherein the reflector is generally parallel to the at least one array antenna and spaced at a predetermined distance from the at least one array antenna.

66. (New): The claim according to 41, further comprising:

a plurality of second collapsible membranes secured to the first collapsible membrane wherein the plurality of second collapsible membranes are formed of a deformable, conductive material; and

a plurality of second ring supports secured to the perimeter of the plurality of second collapsible membranes and wherein the plurality of second ring supports are formed of a second deformable, spring-like material.

67. (New): An antenna comprising:

at least one collapsible membrane formed of a flexible material;

a first ring support attached to the at least one collapsible membrane wherein the first ring support is formed of a deformable, spring-like material;

a second ring support attached to the at least one collapsible membrane and coupled to the first ring support in such as way as to allow folding the first and second ring supports with respect to each other, thus forming a wedge, and wherein the second ring support is formed of a deformable, spring-like material;

at least one boundary component attached to the at least one collapsible membrane;

a feed probe electrically connected on the feed probe's first end to the at least one boundary component inside either the perimeter of the first or second ring supports and passing through the perimeter of the second ring support; and

an antenna interface adapter electrically connected to the feed probe's second end.

Remarks

I. Disposition of Claims

Claims 1-64 are pending in this application. Claims 51-64 stand allowed. Claims 4-6, 29, 35-37, 42-44, 46 and 50 stand objected to. Claims 1-3, 7-28, 30-34, 38-41, 45, and 47-49 stand rejected. Claim 65 has been added in this paper.

II. Claim Rejections -- §102(b) (Raab)

Claims 1-3, 7, 9-24, 26-28, 30-34, 38, and 47-49 stand rejected under 35 U.S.C. §102(b) as being anticipated by USPN 5,777,582 to Raab hereafter referred to as "**Raab.**"

A rejection under 35 U.S.C. §102 must contain every element recited in the claim in as complete detail as is contained in the claim and arranged as recited in the claim. MPEP §2131 provides:

> A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. *Verdegall Bros. v. Union Oil Co. Of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim.

The Applicants respectfully argue that because from the facts derived from the reference, as set forth below, the cited reference does not contain every element recited in the rejected claims either expressly or inherently described and in as complete detail as is contained in the *amended* claims and arranged as recited in the amended claims. Thus, the Applicants respectfully request reconsideration of the rejection in light of the amendments for the following reasons.

II.A. Claims 1-3, 7, 9-20

Independent Claims 1, 7, and 18 to which Claims 2-3, 9-17, and 19-20 are dependent on, respectively, have been amended to include a ring support limitation. **Raab** does not expressly or inherently describe a ring support formed of a deformable, spring-like material attached to the perimeter of a collapsible membrane. Accordingly, Applicants respectfully traverse and request reconsideration of the rejection to Claims 1-3 under 35 U.S.C §102(b) in light of the amendment to Claims 1, 7, and 18.

II.B. Claim 21

Independent Claim 21 contains the following limiation: "a collapsible front layer attached to the perimeter of the collapsible back layer." Conversely, **Raab** discloses a pair of flexible dielectric sheets maintained at a constant separation from each other (ref: **Raab**, Col. 2, lines 33-35). The two sheets or membranes are kept separate at a constant separation by means of spacing devices, e.g., spacer (ref: **Raab**, Col. 3, lines 57-58). Nowhere does Raab expressly or inherently describe directly attaching a collapsible front layer to the perimeter of a collapsible back layer. Accordingly, Applicants respectfully traverse and request reconsideration of the rejection to Claim 21 under 35 U.S.C §102(b) in light of the arguments above.

II.C. Claims 22-24, 26-28, 30-33

Independent Claim 22, to which Claims 23-24, 26-28, and 30-33 are dependent on, has been amended to include a ring support limitation. **Raab** does not expressly or inherently describe a ring support formed of a deformable, spring-like material attached to the perimeter of a collapsible membrane. Accordingly, Applicants respectfully traverse and request reconsideration of the rejection to Claims 22-24, 26-28, 30-33 under 35 U.S.C §102(b) in light of the amendment to Claim 22.

II.D. Claim 34

Claim 34 has been cancelled. The limitation of cancelled Claim 34 has been included in independent Claim 22 as described in Section II.C. of this paper.

II.E. Claims 38, 47-49

Independent Claim 38, to which Claims 47-49 are dependent on, has been amended to include a first ring support limitation. **Raab** does not expressly or inherently describe a first ring support formed of a deformable, spring-like material attached to the perimeter of a first collapsible membrane. Accordingly, Applicants respectfully traverse and request reconsideration of the rejection to Claims 38, 47-49 under 35 U.S.C §102(b) in light of the amendment to Claim 38.

III. Claim Rejections -- §103(a) (Raab)

Claims 8, 25, 39-41, and 45 are rejected under 35 U.S.C. §103(a) as being unpatentable over **Raab**. Applicants traverse this rejection for the following reasons:

The reference does not teach or suggest all the claim limitations in the amended claims. When evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. MPEP §2143.03 states:

> "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art."

Because from the facts derived from the reference, as set forth below, the reference does not teach or suggest all of the claim limitations per the amended claims, and thus, the Applicants respectfully request reconsideration of the rejection in light of the amendments.

As described in Section II of this paper, independent Claims 7, 22, and 38, to which Claims 8, 25, 39-41 and 45 are dependent on, respectively, have been amended to include a ring support limitation. **Raab** does not teach or suggest a ring support formed of a deformable, spring-like material attached to the perimeter of a collapsible membrane. Accordingly, Applicants respectfully traverse and request reconsideration of the rejection to Claims 8, 25, 39-41, and 45 under 35 U.S.C §103(a) in light of the arguments above.

IV. Added Claims

Claim 65 represents objected to Claim 29 rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 66 represents a claim dependent on Claim 41. Claim 66 is similar to Claim 42, however, Claim 66 does not claim a third ring support as opposed to Claim 42.

Claim 67 represents a slight variation of allowed Claim 55.

V. Miscellaneous Amendments

The following amendments were made for clerical purposes and were not made to overcome any prior art.

Claim 4 was amended to delete the limitation of a ring support in light of the fact that this limitation was added to independent Claim 1, to which Claim 4 is dependent on.

Claim 35 was amended to modify its dependency from the cancelled Claim 34 to independent Claim 22.

Claim 42 was amended to delete the limitation of a first ring support in light of the fact that this limitation was added to Claim 38, to which Claim 42 is dependent on.

Claims 44 and 46 were amended to delete the limitation of a ring support in light of the fact that this limitation was added to independent Claim 38, to which 44 and 46 are dependent on. Claims 44 and 46 were also amended to to include the word "first" before "collapsible membrane" to ensure proper antecedent basis.

Claims 48-50 were amended to include the word "first" before "collapsible membrane" to ensure proper antecedent basis.

Claim 56 was allowed but was amended to add a "semi-rigid" materials option. This amendment is supported in the Applicants' specification (ref: Applicants' specification, page 34, paragraph 0056, lines 14-16).

VI. Conclusion

In summary, Applicants now therefore respectfully submit that the application presently stands in condition for allowance.

The Commissioner is hereby authorized to charge any fee which may be required, or credit any overpayment, to Deposit Account No. 14-0116.

Respectfully submitted,

Date: 1/9/06

By Theodore U. Ro

Theodore Ro, Reg. No. 52,168
Attorney for Applicants

NASA Johnson Space Center/AL
NASA Parkway
Houston, TX 77058
Telephone: 281-244-7148
Datafax: 281-483-6936